(12) UK Patent Application (19) GB (11) 2 077 203 A

(21) Application No 8018325
(22) Date of filing 4 Apr 1980
(43) Application published
16 Dec 1981
(51) INT CL³
B62D 55/24
(52) Domestic classification
B7H E1B E1C E2E E2G
(56) Documents cited
GB 1126170
GB 948843
GB 925032
GB 594767
(58) Field of search
B7H
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(54) Removable Vehicle Track

(57) A removable track 3 for vehicles is made up of links 7. The track 3 can be put on around the normal wheels and tyres of the vehicle so as to convert it into a tracked or half-tracked vehicle. The links 7 have U-shaped members 17 partially embedded in them, the arms of the U preventing the track from coming off the wheels in use. The arms of the U are convexly curved in the direction of the length of the track, and may be coated with polyurethane, both features reduce scuffing and tyre wear. Adjacent links 7 may be joined by a bolt passing through lugs 13, so that the track may be opened between any two links.

A kit can be provided of standard length links and a few links of other lengths (e.g. submultiples of the standard length) so as to allow the making of a track of suitable length for the prevailing circumstances.

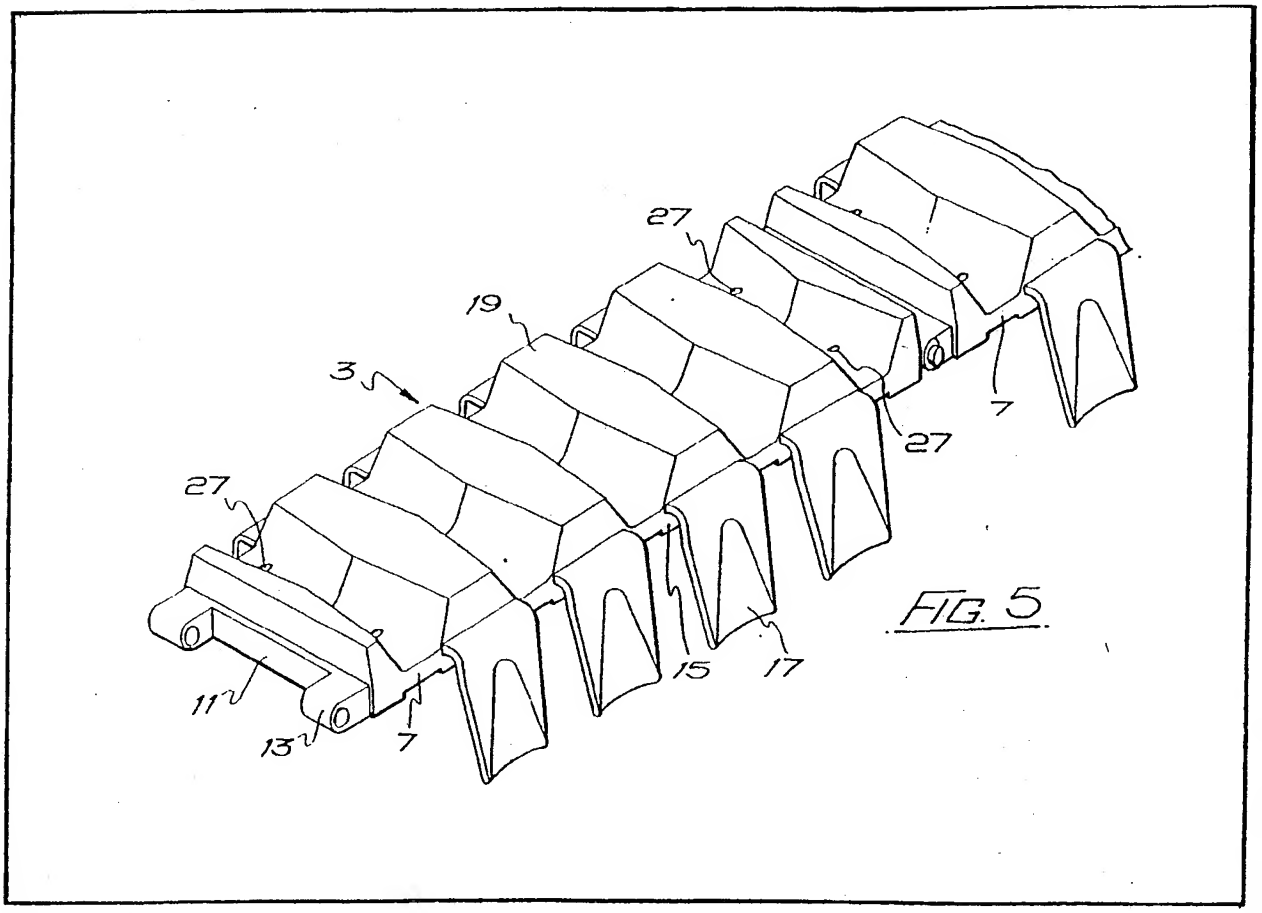

FIG. 5

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The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

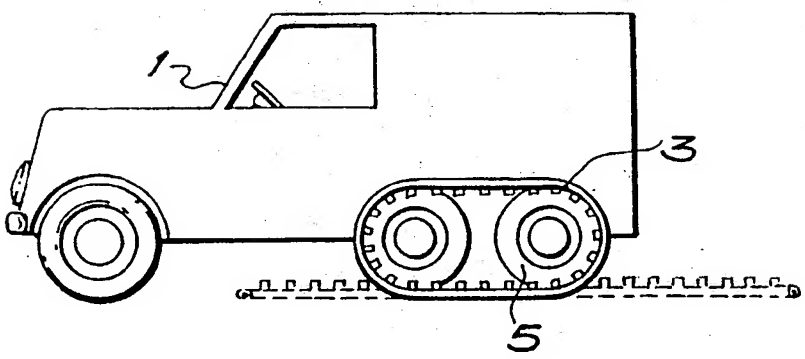

FIG. 1

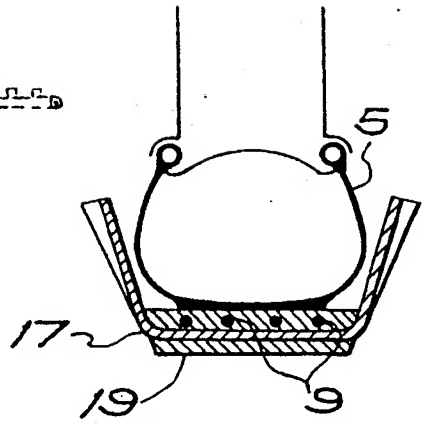

FIG. 2

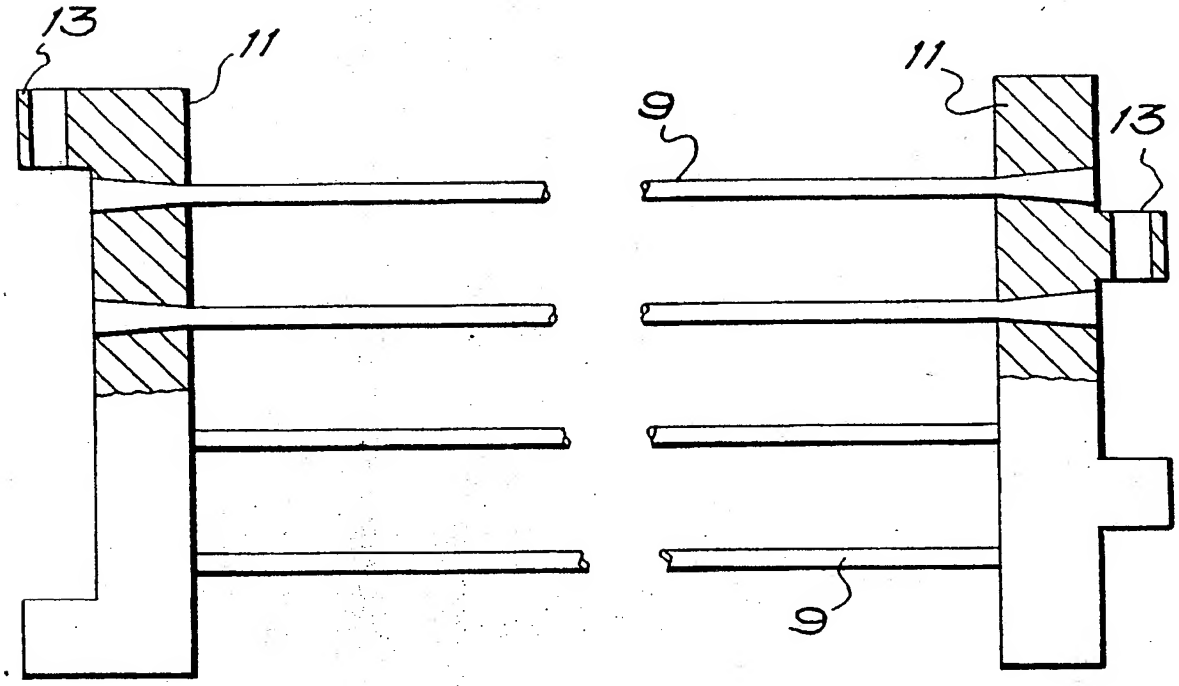

FIG. 3

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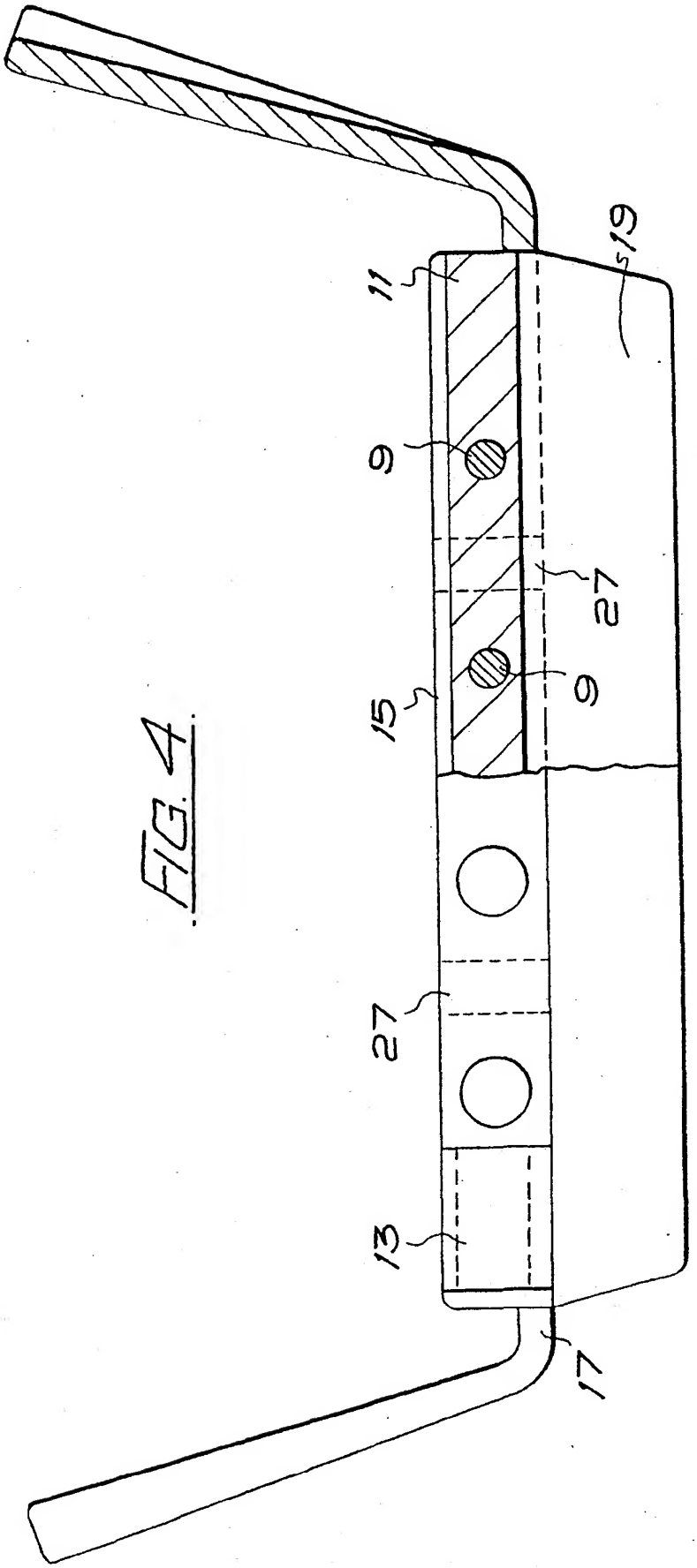

FIG. 4

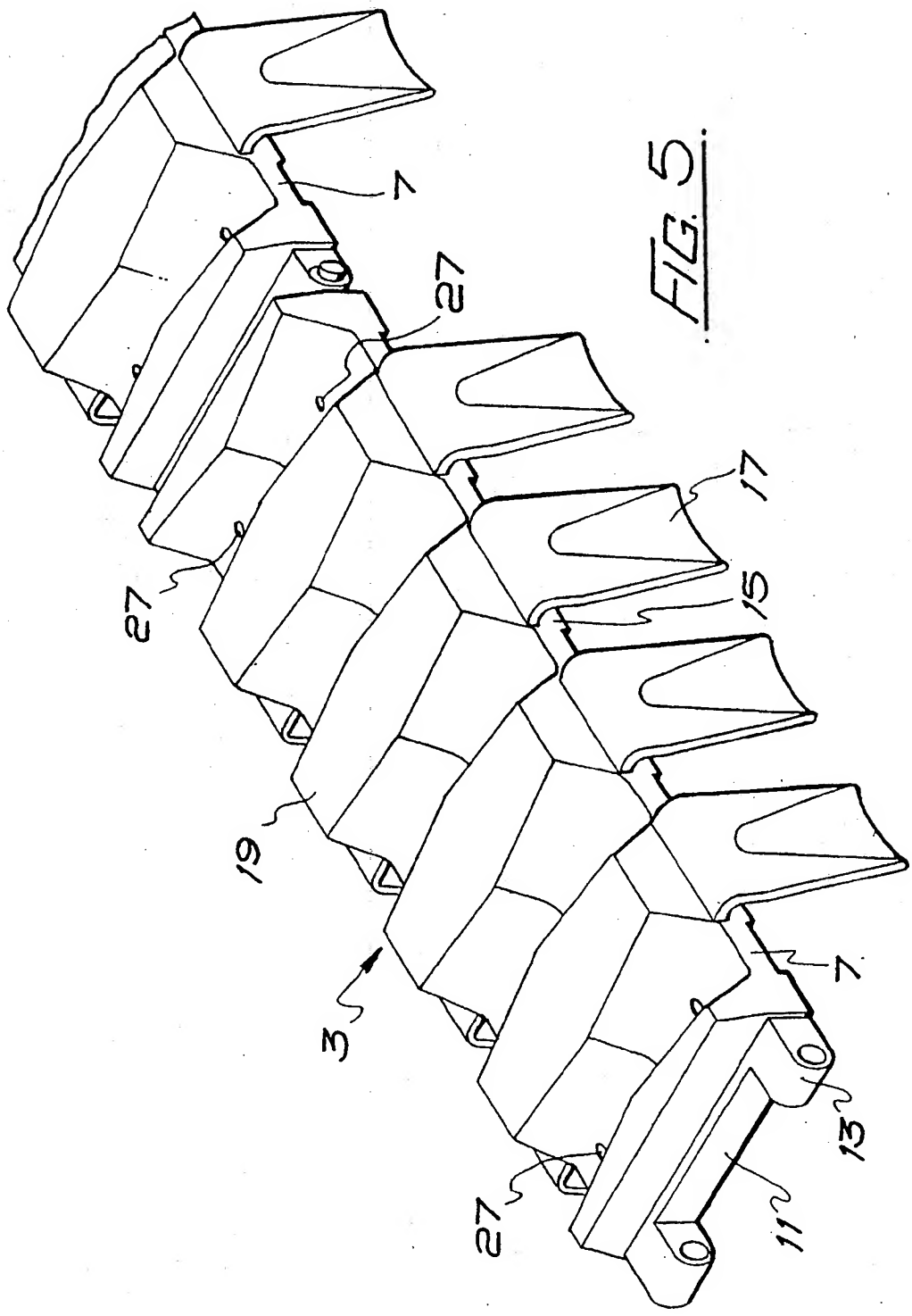

FIG. 5

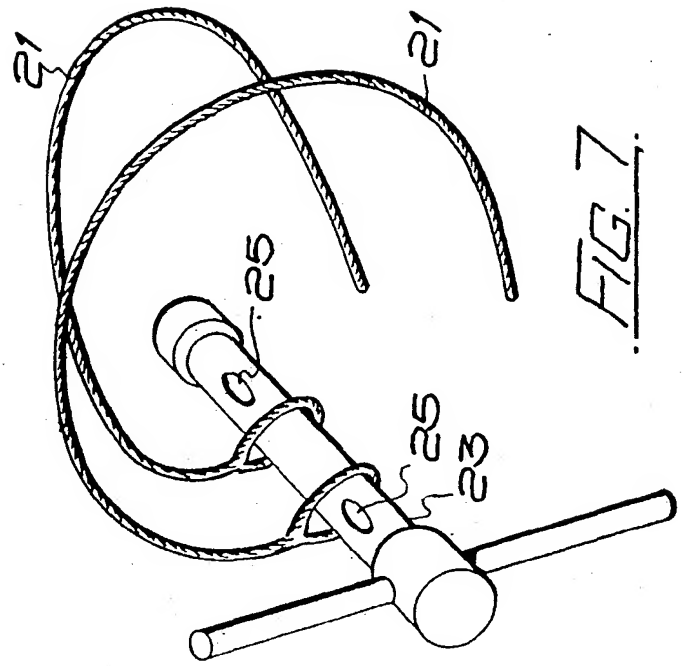

FIG. 7.

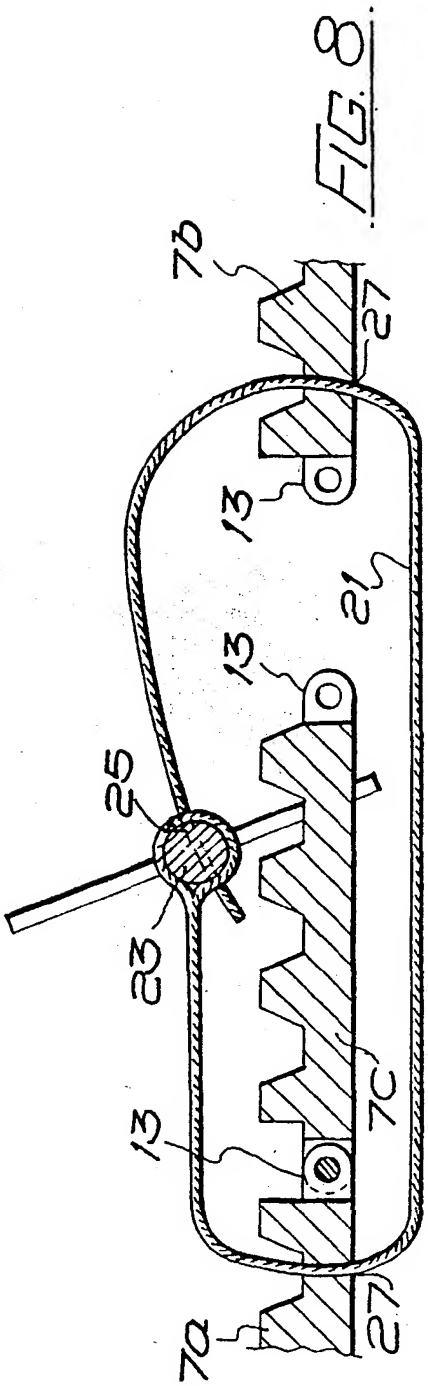

FIG. 8.

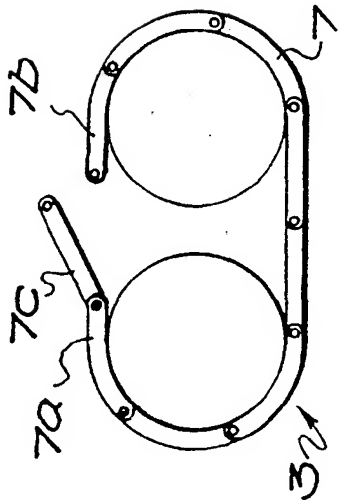

FIG. 6.

SPECIFICATION

Removable Vehicle Track

The present invention relates to the provision of removable tracks for land vehicles. It is known to provide an endless track which may be fitted over the existing tyres and road wheels of a vehicle, so as to convert the vehicle from a wholly wheeled state to a tracked or half-tracked state. Commonly these tracks are for vehicles with twin adjacent wheels at each end of the axles around which the track is to be fitted. Such tracks usually have a central longitudinal ridge or row of projections on the face away from the ground contacting surface, which fit between the two twin wheels and prevent the track from slipping off sideways during tracked driving of the vehicle.

The present invention provides for the fitting of a removable endless track to land vehicles around only one wheel at each end of the axles around which the track is to be fitted. The track is fitted over the normal wheels and tyres used when driving the vehicle in its wheeled state. The invention has particular applicability to the conversion of six-wheeled three-axled vehicles to half-tracked vehicles by fitting the tracks around the rear two wheels on each side.

Each track is formed of links, so that the track has a suitable total length. The links may all be of a uniform length, but to achieve the desired total length of the track, some links may be supplied in submultiples of that length so that from a suitable "kit", any of a range of vehicles may be fitted on site. The links contain a number of longitudinally extending flexible elements, such as wires or ropes, of adequate strength to take the greater part of the longitudinal stress placed on the track during fitting and use. The wires or ropes are spaced apart across the width of the track, and are firmly attached to a common end bar at each end of the link. They may be steel wire ropes, though other materials, metal or non-metal may be used.

The links are made so that they may be easily attached to each other and detached from each other. Suitably there may be provided lugs integral with or firmly attached to the end bars, which allow the links to be joined by a bolt running across the width of the track and passing through the lugs.

The wires or ropes and the end bars are encapsulated in a flexible material, such as polyurethane or a polymer blend. Preferably this flexible material is resilient. When the track is in use this flexible material may be in contact both with the ground and with the tyres of the wheels around which the track is fitted. This construction can act to reduce the noise made by the vehicle when it is in motion.

In order that the track should not come off the wheels when the vehicle is in motion in a tracked state the track is provided with members extending from the edges of the track in a direction generally away from the ground contacting surface. Conveniently these can be made as a series of roughly U shaped units spaced apart along the length of the track, there being at least one per link. The arms of the U extend away from the ground contacting surface one at each side of the track, while the central part of the U is embedded within the flexible material of the track. The members may be specially shaped to reduce scuffing of the tyre side walls by angling the arms away from each other, and by curving each arm across its width so that the front and back of the U are splayed out. Typically the arms are only slightly curved if at all at their bases, the curvature increasing with distance along the arm. The members may be made of any substantially rigid material, such as steel, and may have a coating of abrasion reducing material such as polyurethane.

The ground contacting surface of the track preferably has a tread design suitable for providing forward or reverse traction without retaining stones between parts of the tread. The opposing surface of the track may also be provided with a tread so as to improve traction between the track and the tyres with which it is in contact.

A suitable way of fitting the track is to lay it out behind the vehicle in line with the wheels, and then reverse the vehicle onto it. The track may then be wrapped round the wheels to which it is to be fitted and the ends joined together. It will usually be necessary to use a tool to pull together the two ends of the track with more force than could be provided by manual efforts alone, before the ends can be joined. This is necessary in part because the individual links are likely to resist the deformation required to bend them to conform to the tyre profile.

Preferably each links is joined to the next in a simple and easily detachable manner, so that when the track is to be removed the break in the track necessary to unwrap it may be made between any two links according to convenience, rather than having to be made at the joint where the track was joined up when it was fitted. It may be advisable to use the track fitting tool to reduce tension on the joint before it is undone.

In order to alter the length of the track (e.g. as necessitated by the fitting to the vehicle of new tyres with a different outside diameter from those previously fitted), or for maintenance purposes, links and/or part links may be added to and/or removed from the track.

An embodiment of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 shows a vehicle fitted with tracks according to the invention;

Figure 2 shows a cross-section of part of a wheel fitted with a track according to the invention;

Figure 3 is a view of the wire ropes and end bars of a link of track according to the invention, partly in section;

Figure 4 shows an end view partially in section of a track according to the invention;

Figure 5 shows an isometric view of a track according to the invention;

Figure 6 shows a track according to the invention wrapped around two wheels before the ends are joined;

Figure 7 shows a tool used in the joining of the ends of the track; and

Figure 8 shows the tool of Figure 7 in position at the start of the joining operation.

A six-wheeled three-axled vehicle 1 such as a converted and Rover (R.T.M.) may be converted from a wheeled state to a half-tracked state by fitting a track 3 around the rear two wheels on each side of the vehicle. The track is fitted around the normal road tyres 5 already on the vehicle.

The track 3 is made of a number of links 6. Each link has a number, in this case four, parallel longitudinal spaced apart steel wire ropes 9 of adequate breaking strain running between two end bars 11. The steel wire ropes 9 are firmly secured to the end bars 11 by crimping or white metal solder. Integral with the end bars 11 are lugs 13 for joining the links together. The wire ropes 9 and end bars 11 are encapsulated in a flexible material 15.

U-shaped members 17 pass through the flexible material 15 between the wire ropes 9 and the ground contacting surface. The base of each U runs across the width of the track, and the arms extend away from the ground contacting surface and are angled slightly, e.g. at a total included angle of 30° to 60°, away from each other. Where the arms join the base of the U they are substantially straight across their width (i.e. the direction parallel to the length of the track). However, further out, the arms are curved across their width to present a convex curvature to the tyre, the curvature increasing towards the ends of the arms and forming a slight waist between those outward portions mid-way along their width. (See Figures 2 and 5). There may be four U-shaped members 17 spaced along the length of each link 7. In use the arms of the U-shaped members 17 extend to overlap the side walls of the tyres 5, and thus prevent the track 3 from slipping sideways off the wheels of the vehicle when in motion. The shape of the U-shaped members 17 reduces their scuffing effect on the side walls of the tyres 5. They may be made of any substantially rigid material, such as steel, and may have an abrasion reducing coating, e.g. of polyurethane.

The ground contacting surface of the track 3 is provided with a tread 19 so as to improve traction.

The links 7 are joined together to form the track 3 by passing a bolt through the lugs 13 at the ends of adjacent links 7. The bolt is secured by any suitable means, such as a castellated nut and split pin, or a self locking nut.

Part links may be provided. These are constructed in the same way as the links 7 but are not as long. They may be made, for example, in half-link, third-link, and quarter-link, lengths. By the use of these the total length of the track 3 may be chosen to suit the needs of any particular use.

To fit the tracks 3 to a vehicle 1 the tracks 3 should be laid out behind and aligned with the rear wheels of the vehicle 1. The vehicle 1 is then reversed onto the tracks 3, stopping when the rear wheels are about half-way along the tracks, as shown in phantom in Figure 1. The tyres 5 of the wheels should be located between the arms of the U-shaped members 17. The track is then wrapped around the wheels so that there is a gap between the ends between and above the wheels (see Figure 6). The gap is closed by use of a tourniquet tool as shown in Figure 7 or other suitable tool. The tourniquet took has two nylon ropes 21 each with loop at one end. Passing through those loops is a rod 23 with two holes 25 through it. The nylon ropes 21 are passed through holes 27 in links just in from the end bars 11. The links used are those one in from the end of the track on one side of the gap (7*a* Figure 8) and the one at the end of the track on the other side of the gap (7*b* Figure 8). The link 7*c* between these is supported on the nylon ropes 21. The free ends of the ropes 21 are then passed through the holes 25 (see Figure 8) and the rod 23 is then turned with a lever. As the ropes 21 are wound up on the rod 23 the links 7*a* and 7*c* are pulled towards link 7*b*. When the lugs on links 7*b* and 7*c* overlap a bolt may be passed through them and fastened as described above. The tourniquet tool may then be unwound and removed.

To remove the track the bolt may be removed between any two links, whichever is most conveniently positioned. To replace an individual link for maintenance purposes it may be removed from the track by taking out the bolt at each end, without further disassembling the track.

Claims

1. A removable endless track for land vehicles which track may be fitted around the normal wheels and tyres of a land vehicle and which has links with discrete guide members partially embedded in and extending from the sides of the links in a direction generally away from the ground contacting surface of the track, the guide members extending in use on either side of the said tyres and resisting lateral movement of the tracks of the said tyres.

2. A track according to claim 1 in which the said guide members are arranged in opposed pairs one on each side of a link; and the pairs are formed as substantially U-shaped members, the base of each U passing through and being embedded in the material of a link and the two guide members of each pair each having one arm of the *U*.

3. A track according to claim 2 in which the arms of the substantially U-shaped members are angled away from each other at a total included angle of between 30° and 60°.

4. A track according to claim 2 or claim 3 in which the inner opposed surfaces of the arms of the substantially U-shaped members are convexly

curved in the direction of the length of the track.

5. A track according to any one of the preceding claims in which the guide members are coated with an abrasion reducing material.

6. A track according to claim 5 in which the abrasion reducing material is polyurethane.

7. A track according to any one of the preceding claims in which the guide members are formed of a relatively rigid material and are embedded in a relatively flexible material from which the links are formed at least in part.

8. A track according to claim 7 in which the guide members are formed of steel.

9. A track according to any one of the preceding claims in which each link has a rigid bar at each end and one or more flexible and tension-taking members disposed longitudinally of the link between and firmly attached to the end bars, the end bars and tension-taking members being partially or wholly embedded in a relatively flexible material.

10. A track according to claim 9 in which the tension-taking members are steel wire ropes.

11. A track according to any one of claims 7 to 10 in which the relatively flexible material of the links is a resilient polymeric material.

Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1981. Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.